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Journal of Diabetes, Metabolic Disorders & Control

Mini Review
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India@100: diabetes care projection through evidence, partnerships, and professional leadership in next 21 years

Abstract

Background: India faces one of the largest global diabetes burdens, with an estimated 89.8 million adults affected in 2024, over four in ten of whom are undiagnosed.[1] The ICMR–INDIAB study has documented wide regional variation,[2] while NFHS-5 underscores persistent gender and access inequities.[3] Despite this, India has generated high-quality prevention evidence (IDPP, Kerala DPP)[9,10] and scaled national health programmes such as NPCDCS and Ayushman Bharat.[4]

Methods: Narrative synthesis of epidemiological data (IDF 2024, INDIAB), Indian and global prevention trials (IDPP, DPP, Da Qing, Finnish DPS), and government programme reports (NPCDCS, ABDM).

Results: Four anchors are identified for diabetes transformation: (1) equity-first access; (2) life-course prevention; (3) digital and AI integration; (4) clinician–public health convergence. Professional societies (RSSDI, ESI) are highlighted as catalysts for training, registries, quality benchmarks, and policy partnerships.

Conclusion: By 2047, success must be evidence-based and measurable: ≥80% awareness of diabetes, ≥60% achieving HbA1c <7%, halved rates of amputations and blindness, delayed dialysis onset by ≥5 years, and elimination of gender and rural inequities. These targets align with Indian data and global precedents.[2,4,6,13–15] Diabetes in India should evolve from a symbol of systemic gaps to one of resilience and reform.

Volume 12 Issue 2 - 2025

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Received: August 2, 2025 | **Published:** August 18, 2025

Introduction

Diabetes as a mirror and magnifier

Diabetes is more than a clinical condition—it mirrors India's rapid demographic and economic transitions and magnifies systemic gaps in healthcare equity. According to the **IDF Diabetes Atlas 2024**, **89.8 million adults (10.5%)** in India live with diabetes, of which **43% are undiagnosed**.[1] The **ICMR–INDIAB-17 national study (2023)** placed prevalence at **11.4%, corresponding to ~101 million adults in 2021**, and showed striking state-level heterogeneity.[2] Early onset, long disease duration, and clustering with hypertension, obesity, and fatty liver disease amplify the public health challenge.[5] The economic burden is profound: patients with complications spend over three times more on healthcare than those without.[6] The **NFHS-5 survey** further highlights gender disparities, with women underrepresented in diagnosis and treatment uptake.[3] India's centenary in 2047 is not just a historical milestone but an opportunity to embed resilience, equity, and accountability into the nation's diabetes response.

Methods

Narrative synthesis of epidemiological data (IDF 2024, INDIAB), Indian and global prevention trials (IDPP, DPP, Da Qing, Finnish DPS), and government programme reports (NPCDCS, ABDM).

This manuscript adopts a narrative synthesis approach, integrating epidemiological data, national surveys, clinical trial results, and programmatic reports relevant to diabetes in India. The inclusion scope covered peer-reviewed articles, government programme reports, and authoritative datasets published between 2000 and 2024. Priority was given to epidemiological studies with national or multi-state coverage (e.g., ICMR–INDIAB, NFHS); prevention and management trials conducted in India or with global relevance to low- and middle-income countries (e.g., IDPP, Kerala DPP, DPP, Da Qing, Finnish DPS); policy and programme reports from official government sources (NPCDCS, Ayushman Bharat, ABDM) and from WHO or IDF; and high-impact international evidence where applicable to India's context.

Sources were identified through targeted searches of PubMed, Scopus, official government portals, and publications from professional societies (e.g., RSSDI, ESI). Selection emphasised studies and reports with clear methodological descriptions, robust data quality, and relevance to India's long-term diabetes care strategy. Data were synthesised to identify trends, implementation experiences, and opportunities aligned with India's 2047 health system vision.

The evolving landscape of diabetes in India

Early onset and long duration

Indian adults develop type 2 diabetes nearly a decade earlier than Western populations, often at lower body mass indices.[5] This extends lifetime exposure to hyperglycemia and accelerates complications.

Complications at presentation

The Chennai Urban Rural Epidemiology Study (CURES) reported retinopathy in nearly 18% of individuals with diabetes, much of it undetected until late stages.[7] National cohort data confirm that only **24.8% achieve HbA1c <7%**.[8]

Urban–rural convergence

ICMR–INDIAB documented rising rural prevalence, narrowing the urban–rural gap.[2] This signals that diabetes is no longer an urban disease but a nationwide challenge.

Gender and social dimensions

Women face barriers in diagnosis and continuity of care, while caregivers—largely women—carry disproportionate burdens of informal care.[3]

Lessons from two decades: what worked, what didn't

Proof of prevention

The **Indian Diabetes Prevention Programme (IDPP)** provided landmark evidence that lifestyle modification reduces diabetes incidence by 28.5% among individuals with impaired glucose tolerance.[9] The **Kerala Diabetes Prevention Program (K-DPP)** extended this to a peer-support model delivered through community health workers.[10] Together, these studies demonstrate that culturally adapted prevention is feasible at scale.

Partial progress in policy platforms

The **NPCDCS** has established NCD clinics across districts, integrating diabetes screening and management. **Ayushman Bharat Health and Wellness Centres** have expanded primary care capacity, while the **Ayushman Bharat Digital Mission (ABDM)** is building a framework for longitudinal digital health records.[4,5,11] Programs like **mDiabetes** showed the potential of mobile-based education and adherence support.[12] Telemedicine and teleophthalmology pilots during COVID-19 have highlighted the feasibility of remote diabetes care.

The missing middle

Specialized tertiary centers and grassroots outreach programmes exist, but the district hospital, primary care physician, and diabetes educator—vital for continuity of care—remain under-resourced. This "missing middle" weakens India's ability to deliver sustained chronic disease management.

Anchors for India@100: a framework for reimagining care

Equity-first access

Every Indian should have access to essential diagnostics (HbA1c, retinal screening, urine ACR), medicines (including insulin and newer therapies where appropriate), and follow-up at their first point of contact. District-level equity indicators should be publicly reported.

Life-course prevention

Prevention must begin in schools and workplaces, extend to **gestational diabetes screening and follow-up**, and continue into elderly care. This life-course approach integrates prevention, treatment, and complication management seamlessly.

Technology and AI as enablers

Connected devices, mobile health platforms, and AI-supported risk prediction can extend care beyond metropolitan centres. Public–private partnerships can lower the cost of CGM, smart insulin pens, and digital screening tools.

Clinicians as architects

Beyond individual care, medical professionals must help design systems—standardized protocols, training, audits, and regional digital pilots.Diabetologists, endocrinologists, and physicians must co-lead community-oriented models alongside government health programmes. Training frontline workers (ASHAs, ANMs) in diabetes basics can extend the reach of clinical expertise.

Societies as catalysts of change

Societies as learning systems

Professional societies are uniquely positioned to accelerate India's diabetes response. RSSDI, ESI, and allied bodies must evolve into engines of quality improvement, training accreditation, and implementation science.

I. **Capacity Building:** RSSDI, with its large membership, can train physicians, nurses, dietitians, pharmacists, and diabetes educators at scale.

II. **Guidelines and Quality Indicators:** Societies can standardize care protocols and develop measurable benchmarks for glycemic control and complication screening.

III. **Registries and Research:** RSSDI-led registries on foot disease and complications provide models for broader national registries, in collaboration with ICMR and ABDM.

IV. **Policy Partnership:** Societies can amplify evidence in policy dialogues, supporting NPCDCS and Ayushman Bharat implementation.

V. **Global Engagement:** Collaborations with **IDF and WHO-SEARO** enhance India's global leadership role in diabetes care.

Societies must transition from being primarily academic conveners to **implementation partners**—bridging evidence, practice, and policy.[16]

Conclusion

Shared responsibility, shared legacy

India's diabetes epidemic is formidable but not insurmountable. With **ICMR research, government-led platforms, and global collaborations**, the foundations already exist. The next 25 years must focus on scale, integration, and equity—driven by government programmes, strengthened by professional societies, and guided by evidence. At India@100, diabetes should not remain a story of systemic gaps. Instead, it should represent how a nation confronted its greatest chronic disease challenge with science, solidarity, and shared leadership.

Acknowledgments

None.

Conflicts of interest

The author declares that there are no conflicts of interest.

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Citation: Maheshwari A, Gupta A. India@100: diabetes care projection through evidence, partnerships, and professional leadership in next 21 years. *J Diabetes Metab Disord Control.* 2025;12(2):61–63. DOI: 10.15406/jdmdc.2025.12.00298